

## SPECIFICATION

### SPACE-SAVING CABLE CONNECTOR ASSEMBLY WITH BLIND MATE STRUCTURE

#### BACKGROUND OF THE INVENTION

##### 1. Field of the Invention

**[0001]** The present invention generally relates to a cable connector assembly, and more particularly to a space-saving cable connector assembly with blind mate structure.

##### 2. Description of Related Art

**[0002]** Cable connector assemblies are widely used for signal or power transmission between personal computers and peripheral equipments. Such a cable connector assembly is usually needed to be mounted to a panel on which a plurality of connectors are arranged side by side to form a sub module. U.S. Patent Nos. 4,647,130 and 4,915,641 each disclose such an assembly.

**[0003]** The connector assembly disclosed in U.S. Patent No. 4,647,130 comprises matable plug and receptacle connectors. The plug connector comprises a pair of flanges diagonally formed at opposite ends of a base thereof and a pair of guide pins disposed at opposite ends of the base and diagonally across from each other. Each flange defines a mounting hole therein and a pair of arcuate projections are located at a substantial angle from the major axis of the plug connector and are around a corresponding mounting hole. A pair of elastomeric ring-like members are secured around a respective pair of projections, thus becoming elongated. A

pair of shoulder screws respectively protrude through the mounting holes and the elastomeric ring-like members to tightly engage with the panel. However, this design is relatively complex in structure and the manufacturing cost is relatively high.

**[0004]** U.S. Patent No. 4,915,641 discloses a pair of matable female and male connectors each mounted to a panel. The female connector comprises a planar mounting flange having mounting apertures therethrough for mounting the assembly to a panel. The male connector comprises a pair of flanges on opposite ends thereof and each flange defines a mounting aperture and a mounting collar therethrough to enable the float mounting of the male connector to an appropriate panel. The collar is a hollow generally cylindrical collar having an aperture dimensioned to receive a bolt, rivet or other connecting means. However, the flanges of the male and the female connectors occupy a relatively big space and the dimension of the male or the female connectors in a longitudinal direction thereof is thus increased.

**[0005]** Hence, an improved space-saving cable connector assembly is highly desired to overcome the disadvantages of the prior art.

## SUMMARY OF THE INVENTION

**[0006]** Accordingly, an object of the present invention is to provide a blind mate cable connector assembly with a minimized transverse size.

**[0007]** In order to achieve the object set forth, a cable connector assembly in accordance with the present invention comprises an insulative housing, a plurality

of conductive contacts received in the housing, a cable comprising a plurality of conductors electrically connected with the contacts, a cover cooperating with the housing to sandwich the cable between the cover and the housing, and a pair of fastening members for securing the cable connector assembly to a panel. The housing comprises a base and a mating portion projecting outwardly from the base. The base comprises an upper surface and a lower surface both extending along the longitudinal direction, a pair of ear portions diagonally disposed at opposite ends thereof and extending toward each other, a pair of polarizing keys respectively formed on the upper and the lower surfaces and arranged in a stagger manner, and a pair of guiding members extending outwardly from the base and spaced by the mating portion.

**[0008]** Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** FIG. 1 is a partially exploded, perspective view of a cable connector assembly in accordance with the present invention;

**[0010]** FIG. 2 is a view similar to FIG. 1, but taken from a different aspect;

**[0011]** FIG. 3 is an assembled view of FIG. 1;

**[0012]** FIG. 4 is a view similar to FIG. 3, but taken from a different aspect;

**[0013]** FIG. 5 is a front elevational view of FIG. 3;

**[0014]** FIG. 6 is a cross-sectional view of the cable connector assembly of FIG. 5 taken along line 6-6;

**[0015]** FIG. 7 is a cross-sectional view of the cable connector assembly of FIG. 5 taken along line 7-7; and

**[0016]** FIG. 8 is a cross-sectional view of the cable connector assembly of FIG. 5 taken along line 8-8.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0017]** Reference will now be made in detail to the preferred embodiment of the present invention.

**[0018]** Referring to FIG. 1 and FIG. 2 in conjunction with FIGS. 5-8, a cable connector assembly 8 in accordance with the present invention, which is mounted to a panel 3 to form a subassembly 9, comprises an insulative housing 1, a plurality of conductive contacts 6 assembled to the insulative housing 1, a flat cable 4 electrically connected with the conductive contacts 6, a cover 2 assembled to the insulative housing 1, a pair of fastening members 5 and a spacer 7 assembled to the insulative housing 1.

**[0019]** The insulative housing 1 is substantially elongated and comprises a base 10 and a mating portion 11 protruding forwardly from a center of the base 10. The insulative housing 1 comprises a mating face 110 and an opposite terminating face 104 (referring to FIG. 6). The insulative housing 1 also defines a mating

direction and a longitudinal direction perpendicular to the mating direction.

**[0020]** A pair of ear portions 12 are diagonally disposed at opposite ends of the base 10 and extending along opposite directions. Each ear portion 12 comprises a first face 122 and an opposite second face 124. A mounting aperture 120 extends from the first face 122 to the second face 124 of the ear portion 12. The second face 124 is coplanar with the terminating face 104 of the insulative housing 1. A pair of polarizing keys 106 are respectively disposed on opposite upper and lower surfaces 105, 107 of the base 10 and are arranged in a stagger manner. A pair of bars 108 are respectively disposed on the upper and lower surfaces 105, 107 of the base 10 adjacent a corresponding polarizing key 106. A pair of guiding members 13 protrude outwardly from the base 10 adjacent to the mating portion 11 and beyond the mating face 110. Each guiding member 13 is chamfered to form a lead-in surface 130. Particularly referring to FIG. 8, a U-shaped receiving cavity 132 is formed in each guiding member 13, thus forming a latch section 134.

**[0021]** The mating portion 11 is substantially D-shaped and defines a receiving space 111 recessed toward the terminating face 104 from the mating face 110. A cavity 102 (FIG. 6) is defined in the terminating face 104. Particularly referring to FIGS. 6 and 8, a plurality of passages 112 are defined in opposite longitudinal inner faces of the mating portion 11 and communicate with the cavity 102 and the receiving space 111. A pair of slits 16 are respectively defined through the base 10 and respectively communicate with the receiving cavities 130. A pair of retaining portions 15 extend beyond the terminating face 104 and each is provided with a pair of wedges 150.

**[0022]** The spacer 7 is elongated and is made of insulative material. A plurality

of passageways 70 is defined through the spacer 7 corresponding to the passages 112.

**[0023]** Referring to FIGS. 1-2 in conjunction with FIG. 6 and FIG. 8, the cover 2 is made of insulative material and comprises a main body 20 and a pair of lateral ends 21. The main body 20 defines a plurality of grooves 202 (FIG. 6) in a front surface thereof. Each lateral end 21 defines a channel 22 therethrough and forms a latch 23 extending outwardly therefrom.

**[0024]** Referring to FIG. 1, in the preferred embodiment, the cable 4 is a flat ribbon cable and comprises a plurality of insulated conductors 40.

**[0025]** Referring to FIG. 6 and FIG. 8, each conductive contact 6 comprises a retention section 62, a mating section 60 extending from one end of the retention section 62 with a curved mating end 600, and a tail section 64 extending from the other end of the retention section 62.

**[0026]** Referring to FIGS. 1-3, each fastening member 5 is a jackscrew and comprises an enlarged operating portion 50, a threaded portion 52 and a medial portion 54 interconnecting the operating portion 50 with the threaded portion 52.

**[0027]** Referring to FIGS. 1-3, the panel 3 is a rectangular board and defines a mounting opening 30 in a center thereof and a pair of mounting holes 31 defined at opposite sides of the mounting opening 30. A pair of rectangular polarizing openings 32 are diagonally recessed from opposite upper and lower inner edges of the mounting opening 30 corresponding to the polarizing keys 106.

**[0028]** In assembly of the cable connector assembly 8, referring to FIGS. 1-5 in conjunction with FIGS. 6-8, the conductive contacts 6 are respectively inserted into the passages 112 with the curved mating ends 600 of the mating sections 60 exposed into the receiving space 111. The retention sections 62 interfere fit into corresponding passages 112 for securing the conductive contacts 6 to the insulative housing 1. The spacer 7 is assembled to the insulative housing 1 and is received in the cavity 102. The tail sections 64 protrude through corresponding passageways 70 of the spacer 7 and extend beyond the terminating face 104 of the insulative housing 1. The insulated conductors 40 of the cable 4 are respectively insulation displacement connected with the tail sections 64 to form an electrical connection therebetween.

**[0029]** The insulative cover 2 is assembled to a rear of the insulative housing 1. The pair of latches 23 and the pair of retaining portions 15 are respectively received in the slits 16 of the housing 1 and the channels 22 of the cover 2 to thereby latch with each other. Thus, the cover 2 is securely attached to the insulative housing 1.

**[0030]** Particularly referring to FIG. 3 and FIG. 7, the pair of fastening members 5 respectively protrude through the pair of mounting apertures 120 of the ear portions 12. The operating portion 50 is exposed beyond the second face 124 of the ear portion 12. The medial portion 54 is received in the mounting aperture 120, and the threaded portion 52 is exposed beyond the first face 122 of the ear portion 12.

**[0031]** Referring to FIGS. 1-5 in conjunction with FIGS. 6-8, when the cable connector assembly 8 is assembled to the panel 3, the mating portion 11 and the

pair of guiding members 13 extend through the mounting opening 30 until the panel 3 abuts against the bars 108 of the base 10 with the pair of polarizing keys 106 respectively received in the polarizing openings 32. The threaded portions 52 of the fastening member 5 respectively protrude through the mounting holes 31. To secure the cable connector assembly 8 to the panel 3, an operator needs to screw a locking nut (not shown) to the threaded portion 52 of the fastening member 5.

**[0032]** It is noted that the pair of ear portions 12 extend toward each other, thus, a dimension of the housing along the longitudinal direction is decreased. Further, the dimension of the polarizing opening 32 along the longitudinal direction being larger than that of the polarizing key 106, the diameter of the mounting aperture 120 being larger than that of the medial portion 54 of the fastening member 5, thus, the cable connector assembly 8 can move relatively to the panel 3 when mating with a complementary connector (not shown) to thereby ensure a reliable engagement therebetween. The chamfered lead-in surfaces 130 can guide proper insertion of the cable connector assembly 8 into the complementary connector in blind mate condition. Moreover, the latch section 134 formed in the guiding member 13 can latch with the complementary connector more reliably.

**[0033]** It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.